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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/830,225	04/23/2004	Dong Ju Moon	05823.0265	7752
22852 7590 08/27/2007 FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP 901 NEW YORK AVENUE, NW WASHINGTON, DC 20001-4413				
			EXAMINER CANTELMO, GREGG	
			ART UNIT 1745	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/830,225

Applicant(s)

MOON ET AL.

Examiner

Gregg Cantelmo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-7 is/are pending in the application.
- 4a) Of the above claim(s) 9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5 and 7 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 4/23/04.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Response to Amendment***

1. In response to the amendment received April 30, 2007:
  - a. Claims 1-3, 5-7 and 9 are pending. Claims 4 and 8 have been cancelled as per Applicant's request.

***Election/Restrictions***

2. Applicant's election with traverse of Group I, claims 1-3 and 5-7 in the reply filed on April 30, 2007 is acknowledged. Claim 9 is withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on April 30, 2007. Action on the merits of claims 1-3 and 5-7 is set forth herein.

Applicant's election with traverse in the reply filed on April 30, 2007 is acknowledged. The traversal is on the ground(s) that the Examiner has not shown that there is a serious burden of search between the two groups. This is not found persuasive because the product of group I can be made by processes other than that of Group I, for example while the process requires adding and mixing a precursor solution with binders and a dispersant, ball milling the mixture to obtain a slurry and coating the slurry onto one side of the electrolyte, the product does not require any such process steps. The product of Group I does not require the binder mixture and dispersant nor is it clearly and definitively limited by the process steps of Group II. The structure of Group I can alternatively be made by a process wherein the catalyst is deposited by

other processes than slurry coating and sintering, such as and furthermore or alternatively can be formed by a process whereby the slurry is coated onto a substrate and not the electrolyte layer. Thus given that there are significant and numerous differences between the product of Group I and the process of Group II, the Examiner maintains that there is a reasonable serious burden of search distinct in each group and the requirement is still deemed proper and is therefore made FINAL.

3. Applicant's election of species is further acknowledged.

***Priority***

4. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Korea on October 25, 2003. It is noted, however, that applicant has not filed a certified copy of the Korean application as required by 35

**U.S.C. 119(b).*Information Disclosure Statement***

5. The information disclosure statement filed April 23, 2004 has been placed in the application file and the information referred to therein has been considered as to the merits.

***Specification***

6. The disclosure is objected to because of the following informalities:
  - a. The equations on pages 2-4 use box symbols which appear to be a typographical error. Appropriate correction is required.

***Claim Interpretation***

7. In light of the fact that claims 1-3 and 5-7 employ the phrase "the improvement comprising", claims 1-3 and 5-7 are interpreted as being Jepson format claims.

***Claim Rejections - 35 USC § 112***

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 recites that the system is applied to various processes producing various gases but as written is unclear as to whether the system is applied to other systems which produce the claimed by-products or use the claimed resources therein or if the system itself contributes to the processes. Furthermore the claims are drawn to a system and claim 7 is an intended use claims for the system of claim 5.

b. Claim 7 provides for the use of the system of claim 5, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

***Claim Rejections - 35 USC § 101***

10. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 7 IS rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claim 1 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. Patent No. 5,656,387 (Barnett).

Barnett discloses a solid oxide fuel cell comprising FIG. 1 is a schematic representation of a thin film SOFC. The cell includes a solid electrolyte 11 such as YSZ, an air or positive electrode film 12 which may be fabricated in accordance with the teaching of co-pending application Ser. No. 08/408,953 filed Mar. 22, 1995 and a negative fuel electrode film (anode) 13 fabricated in accordance with this invention. The fuel cell is supported on a porous substrate 14. In accordance with the invention, the anode 13 is a porous Ni--YSZ composition formed by DC reactive magnetron sputtering from a single metallic source (col. 2, ll. 40-50 and Fig. 1 as applied to claim 1).

As to the intended use of coproducing syngas and electricity by internal reforming of methane and carbon dioxide, while intended use recitations and other

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types of functional language cannot be entirely disregarded. However, in apparatus, article, and composition claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. In re Casey, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); In re Otto, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963).

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). See also MPEP § 2114.

The manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

Since Barnett teaches of the same fuel cell components and compositions as recited in the claim, the prior art fuel cell has the same features as that of the instant claims, is held to be capable of performing the same intended use as recited in the claims and thus anticipates the claimed fuel cell.

12. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by JP 06-342663 (JP '663).

JP '663 discloses a solid oxide fuel cell comprising a fuel electrode 1 made of Ni-YSZ thermet containing Ni at 50% (and hence is a 50:50 mixture of Ni:YSZ), an electrolyte comprising YSZ and LaSrO<sub>3</sub> used as an oxidant electrode 3. Methane is used as the fuel gas (abstract as applied to claims 1 and 3).

As to the intended use of coproducing syngas and electricity by internal reforming of methane and carbon dioxide, while intended use recitations and other types of functional language cannot be entirely disregarded. However, in apparatus, article, and composition claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. In re Casey, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); In re Otto, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963).

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The manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed



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apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

Since JP '663 teaches of the same fuel cell components and compositions as recited in the claim, the prior art fuel cell has the same features as that of the instant claims, is held to be capable of performing the same intended use as recited in the claims and thus anticipates the claimed fuel cell.

13. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,500,307 (Anzai).

Anzai discloses a SOFC comprising a LSM cathode, an Ni-YSZ anode (comparative example 2) and a YSZ electrolyte (col. 3, ll. 5-9 and 44-45 as applied to claims 1 and 2). The amount ratio of Ni to YSZ is 50:50 (col. 8, ll. 32-34 as applied to claim 3).

As to the intended use of coproducing syngas and electricity by internal reforming of methane and carbon dioxide, while intended use recitations and other types of functional language cannot be entirely disregarded. However, in apparatus, article, and composition claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. In re

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Casey, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); In re Otto, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963).

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). See also MPEP § 2114.

The manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

Since Anzai teaches of the same fuel cell components and compositions as recited in the claim, the prior art fuel cell has the same features as that of the instant claims, is held to be capable of performing the same intended use as recited in the claims and thus anticipates the claimed fuel cell.

### ***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

15. Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Barnett, JP '663 or Anzai in view of Staniford et al. "Biogas powering a small tubular solid oxide fuel cell".

The teachings of Barnett, JP '663 and Anzai have been discussed above and are incorporated herein, independent of one another.

The differences between claims 5 and 7 and Barnett, JP '663 and Anzai are that neither Barnett, JP '663 nor Anzai teach of supplying a mixed gas of carbon dioxide and hydrocarbon to the fuel cell (claim 5), simultaneously producing syngas and electricity

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by internal reforming of methane and CO<sub>2</sub> (claim 5) or of the system being applied to various processes including treating landfill gases (claim 7).

While these references do not teach of using a fuel mixture of a hydrocarbon (methane) and carbon dioxide, Staniford recognized that such gas mixtures can be employed as a fuel in SOFC systems so as to produce an acceptable and consistent power output (abstract and Biogas as applied to claim 5).

Since the reactants supplied to the system are fundamentally the same, the use of the mixture of methane and carbon dioxide will produce both electrochemical energy from the fuel cell as well as syngas (as applied to claim 5).

Staniford further teaches that the use of biogas increases the internal reforming of the fuel cell and prevents carbon formation (page 275, bottom paragraph in the left-hand column).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of either Barnett, JP '663 or Anzai by using biogas as the fuel since it would have improved the internal reforming capability of the fuel cell and prevented carbon formation.

***Allowable Subject Matter***

16. The following is a statement of reasons for the indication of allowable subject matter: none of the prior art of record reasonably teach, suggest or render obvious the invention of claim 6 wherein the mixed gas has a volume ratio as defined therein. The combination provides for the disclose tri-reforming conditions wherein the presence of carbon dioxide, steam and partial oxidation each contribute to the reformation of the fuel

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at the anode and while each of these hydrocarbon reforming processes by themselves are known (carbon dioxide, steam and partial oxidation) none of the prior art of record reasonably teach or suggest the combination of gases set forth in claim 6.

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is 571-272-1283. The examiner can normally be reached on Monday to Thursday, 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Gregg Cantelmo  
Primary Examiner  
Art Unit 1745

gc  
August 22, 2007